



**Department of  
Veterans Affairs**

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# **Fact Sheet**

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## **VA's Prosthetics and Sensory Aids**

One of VA's four strategic goals is to restore the capabilities of disabled veterans to the greatest extent possible.

Any veteran with a service-connected disability receiving VA health care can receive prosthetic equipment, sensory aids and devices and have them maintained by VA clinicians.

The number of veterans seeking these services from VA has increased 30 percent since 2000 to 1.4 million in 2004. As the demand increased, so did the budget for VA's Prosthetics and Sensory Aids Service (PSAS): from \$532 million in 2000 to \$935 million in 2004.

About \$66 million of the expenditures went to providing 10,863 veterans with artificial legs or components and 1,774 with artificial arms or components. More than 13,000 patients had repairs of artificial legs or arms. More than 631,000 veterans received eyeglasses, hearing or other neuro-sensory aids costing about \$52 million.

Other products and services disabled veterans received included: wheelchairs and scooters, braces, shoes and orthotics, oxygen and respiratory equipment, other medical equipment and supplies (beds, lifts, computer equipment, telehealth products) and surgical implants (pacemakers, cardiac defibrillators, stents, dental devices). In fact, VA provides items ranging from simple \$2 foam shoe inserts to stair-climbing \$30,000 iBOT wheelchairs to allow disabled veterans to live independently. VA also provides home improvements and structural changes, and adaptive equipment for automobiles, to veterans with service-connected disabilities.

VA has many work groups that develop clinical practice recommendations for prosthetic devices and national contracts to purchase them. The PSAS has nearly 25 contracts, ensuring consistent quality of items furnished to veterans, and the competition among suppliers allows VA to take advantage of economies of scale.

### **History Tied to Wars**

Wars have historically spurred developments in medicine, including technical advances in mobility aids and assistive devices. During the Civil War, Union surgeons alone performed up to 30,000 amputations. After the war, some amputees sought to improve their military-issue limbs and formed their own mail-order companies. By the time World War I broke out, many skilled craftsmen were making limbs, but shysters also abounded.

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Prosthetics fabrication in America remained largely unchanged through World War II. During that war, an amputee typically received a temporary artificial limb when he left the service and was referred to VA for a permanent limb. At VA, often he received a prescription for a prosthesis supplied through a contractor but always the lowest bidder. Veterans stormed the Capitol in protest that they could not receive appliances of the same quality as those that non-veterans could purchase. VA responded in 1945 by centralizing its prosthetics operations and Congress gave VA more flexibility in providing prosthetics.

A national meeting of prosthetics experts that same year launched federal research into the field. In 1947, VA began managing research contracts and established a testing and development lab in New York City. That VA Prosthetics Center encouraged manufacturers to use new plastic laminates instead of wood. In 1949, VA established 30 multi-disciplinary amputee clinics across the country and an education program for the specialists who staffed them.

The years following World War II found VA leading a rapid advance in limb design, fabrication and fitting. In the 1960s, Dr. Ernest Burgess, chief of the clinic at the Seattle VA Medical Center, led a study of the practice of fitting prosthetic devices immediately after amputation, a technique eventually adopted nationwide. His team later developed the Seattle Foot, a prosthesis made of energy-absorbing, spring-like material, and went on to pioneer computed-aided design software for fitting prostheses.

### **Present-Day Professionalism**

VA currently has 63 orthotic-prosthetic labs staffed by 182 employees called prosthetists and orthotists. The majority of these specialists are certified by the American Board for Certification in Orthotics and Prosthetics or the Board of Orthotist and Prosthetist Certification. They provide any devices prescribed and ordered by examining physicians, and consult in clinics, custom fabricate, fit and repair artificial limbs and braces or order them from commercial vendors.

The labs and their staffs have been increasing their certification levels. As of June 2005, 41 of the VA prosthetic and orthotic labs have earned certification by one of the two national accrediting organizations and 106 prosthetists and orthotists were board-certified. Several accredited labs have also earned certification from the National Commission on Orthotic and Prosthetic Education, which enables these labs to participate in residency programs from the nine prosthetic and orthotic programs in universities and colleges in the United States.

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VA specialists in prosthetics and orthotics evaluate a veteran's lifestyle and medical condition to determine which type of prosthetic limb or brace to provide. An orthotist designs, fabricates and fits an orthosis, or brace. A prosthetist designs a limb and fabricates a custom socket, orders components, assembles the prosthesis in a workshop (prosthetic and orthotic lab) and fits the prosthesis to the veteran's residual limb. The prosthetist fine tunes the fit and alignment of the prosthesis. Prosthetists and medical specialists in various disciplines form multi-disciplinary amputee clinic teams, who see the veteran regularly after fitting to ensure the artificial limb functions well.

### **Technologies for Future Advances**

These VA specialists have access to the latest technologies. Last year, they provided 176 veterans with a "C-Leg," a computerized leg that allows people who have had amputations above the knee to approximate a normal gait. The total cost was \$6.3 million.

The C-Leg employs a computer-controlled hydraulic system regulated by internal feedback. Sensors in the foot of the artificial limb route electronic signals about the relative positioning of that foot to the upper joint of the device, which serves as a surrogate knee.

In the past, most VA prosthetic patients lost limbs in combat. Today's typical patient is a middle-aged male who suffered an amputation due to vascular disease, but in the future VA expects to provide prosthetics to many of the Operation Iraqi Freedom veterans who have lost limbs in the war.

A trend in prosthetics aims to integrate body, mind and machine. VA's Center for Restorative and Regenerative Medicine at the VA medical center and Brown University in Providence, R.I., are at the leading edge of a movement to create artificial limbs that function almost like natural ones.

Among works in progress:

- A knee-ankle prosthesis with sensors that measure force, position and movement to feed to an embedded microprocessor. The knee and ankle use electromagnets, friction-modulating fluid and polymers to turn electrical energy into mechanical force, thus creating a kind of artificial muscle enabling amputees to walk greater distances.

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- Microchips that are bionic neurons – or “bions” – will be injected into residual leg or arm muscles to pick up movement signals from the brain and send them to the new limb. Bion technology will provide not only output commands, telling the artificial limb what to do, but sensory feedback, so the prosthesis reports back to the brain what it did without needing to be seen.
- Besides robotics and engineering, new medical techniques are being tested. These include surgery to lengthen bone in the residual limb, making it easier to fit the artificial limb
- and allowing more mobility, and attachment of an artificial leg to a titanium bolt placed in bone to avoid problems of current anchoring methods.

Some assistive devices are not replacements for parts of the body but are adaptations of mainstream technology to compensate for lost physical functioning. At Walter Reed Army Medical Center in Washington, D.C., VA's vocational rehabilitation and employment program has provided voice-recognition computers so Iraq war soldiers who have lost a hand can learn computer skills even without having full typing capability.

Making sure that new devices work in the real world is the ultimate challenge. The C-Leg, for example, popular with Iraq veterans, is being rigorously tested to find out if it makes walking easier than other prostheses. The iBOT wheelchair was tested in 2003-04 before VA authorized prescribing it.

Finally, no less important than new gadgetry and prostheses is the care amputees must receive during rehabilitation. The model for that has changed over the years. The goal is not only to teach amputees to walk or use an artificial arm and hand. Continuing care and long-term support from VA multi-disciplinary teams have shown that patients often can improve their functioning months or years after their injuries or amputation.

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